Trig 4.5 – Worksheet Intro to Graphing $sin(x)$ and $cos(x)$

Name _____

Graph each on the grid provided.

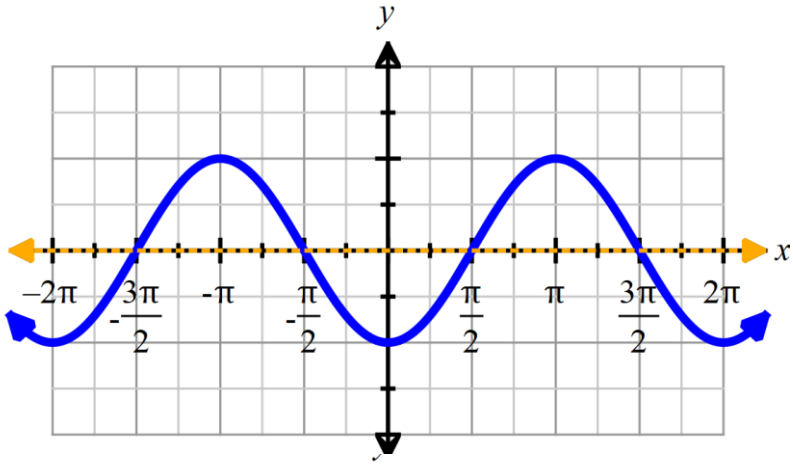
1) $y = -2cos(x)$

A = 2

P = 2π

D: $(-\infty, \infty)$

R: $[-2, 2]$



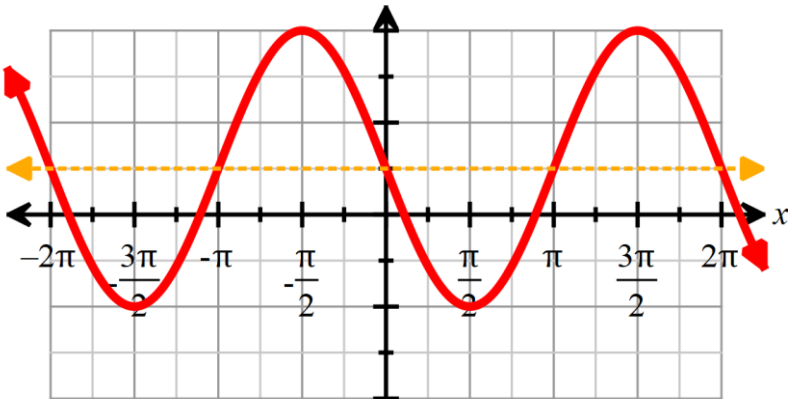
2) $y = -3sin(x) + 1$

A = 3

P = 2π

D: $(-\infty, \infty)$

R: $[-2, 5]$



3) $y = 2sin\left(x - \frac{\pi}{2}\right)$

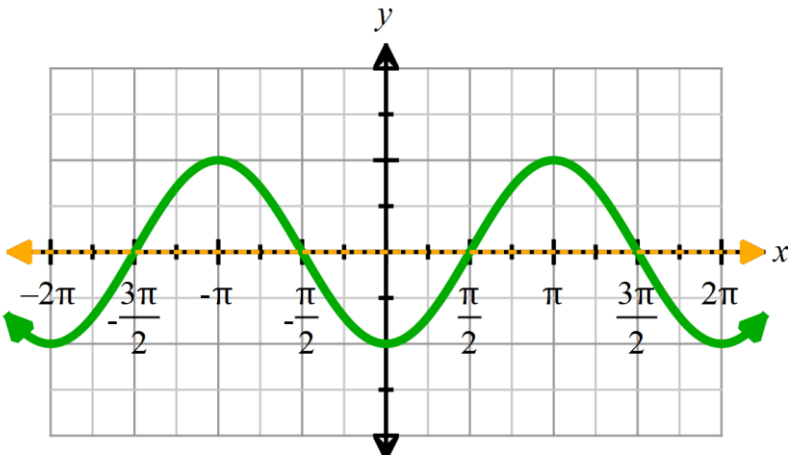
A = 2

P = 2π

D: $(-\infty, \infty)$

R: $[-2, 2]$

P.S. $\frac{\pi}{2}$



4) $y = 3cos(x - \pi)$

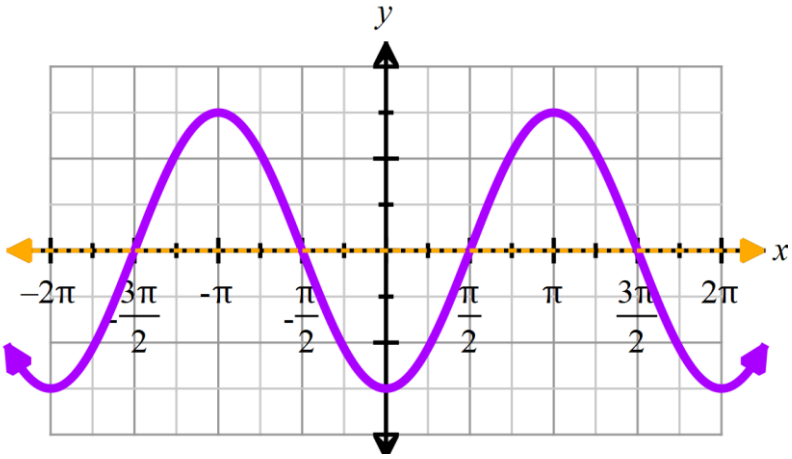
A = 3

P = 2π

D: $(-\infty, \infty)$

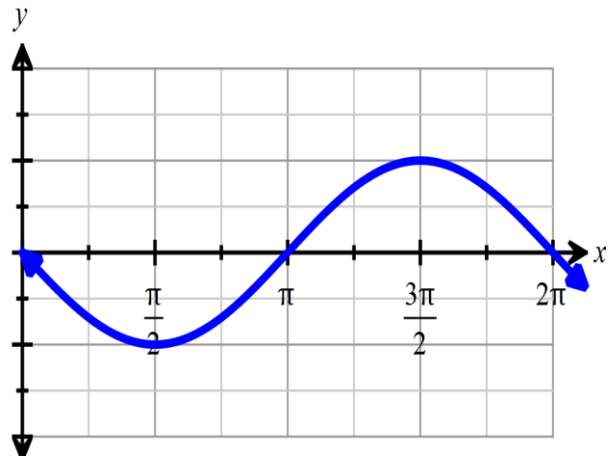
R: $[-3, 3]$

P.S. π



Write an equation for the given graph.

5)

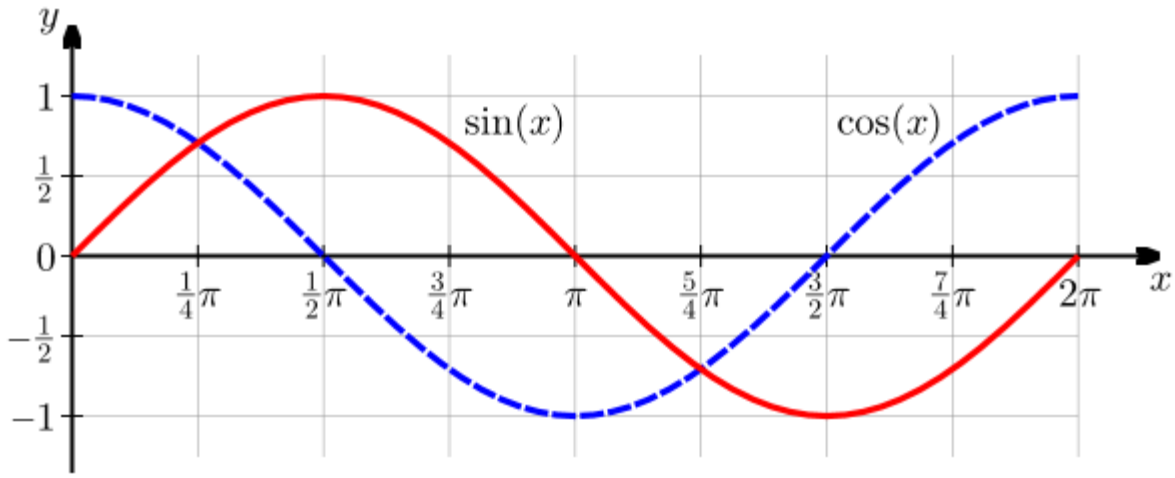


$$y = -2\sin(x)$$

or

$$y = -2\cos\left(x - \frac{\pi}{2}\right)$$

6)



Analyze the $cos(x)$ and $sin(x)$ graphs above and use a phase shift to write $sin(x)$ in terms of $cos(x)$…

$\boldsymbol{sin(x)}$ = _____ $y = \cos\left(x - \frac{\pi}{2}\right)$

Then do the same for $cos(x)$…

$\boldsymbol{cos(x)}$ = _____ $y = \sin\left(x + \frac{\pi}{2}\right)$

Find the amplitude, phase shift, and vertical shift of each.

7) $y = 2sin\left(x - \frac{\pi}{4}\right) + 2$

$A = 2$

$PS = \frac{\pi}{4}$

$VS = 2$

8) $y = -7cos\left(x + \frac{\pi}{9}\right) - 4$

$A = 7$

$PS = -\frac{\pi}{9}$

$VS = -4$

9) $y = 1.6sin(x + 5\pi) + 3$

$A = 1.6$

$PS = -5\pi$

$VS = -4$

Trig 4.5A Worksheet – Graphing $sin(x)$ and $cos(x)$
Compressions and Stretches

Graph each on the grid provided.

1) $y = -2cos(2x)$

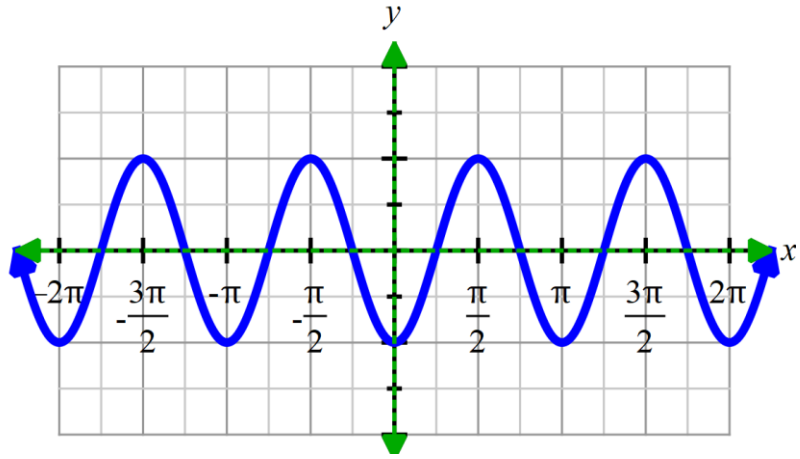
A = 2

P = π

D: $(-\infty, \infty)$

R: $[-2, 2]$

GAP: $\frac{\pi}{4}$



2) $y = -3sin(0.5x) + 1$

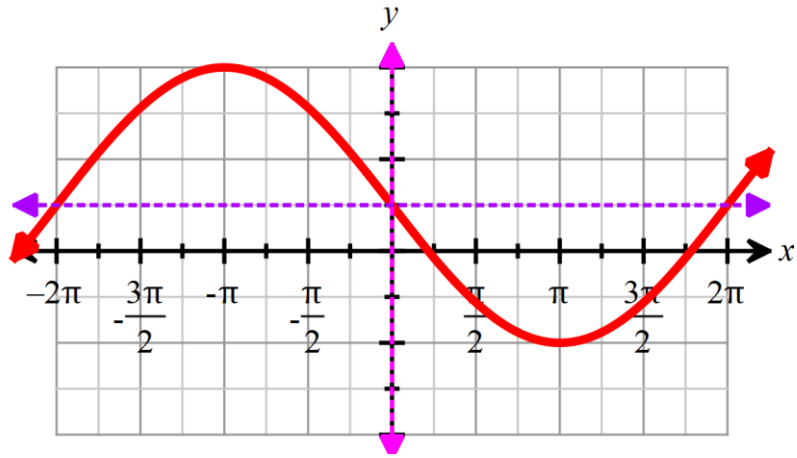
A = 3

P = 4π

D: $(-\infty, \infty)$

R: $[-2, 5]$

GAP: π



3) $y = 2sin(4x)$

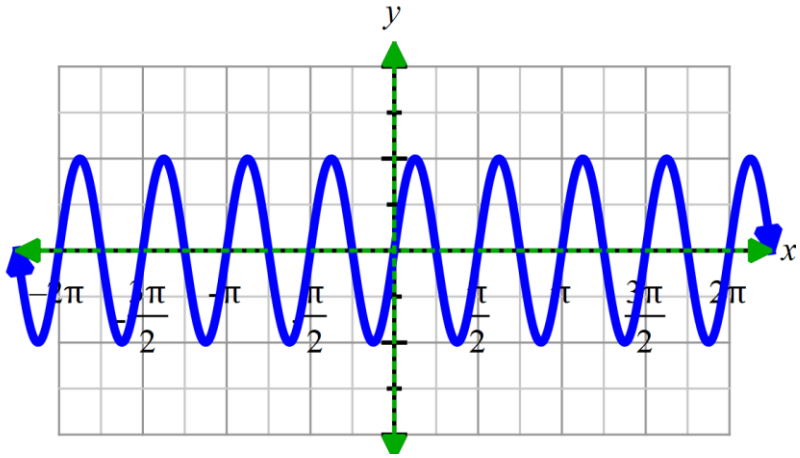
A = 2

P = $\frac{\pi}{2}$

D: $(-\infty, \infty)$

R: $[-2, 2]$

GAP: $\frac{\pi}{8}$



4) $y = 3cos\left(\frac{x}{3}\right) - 1$

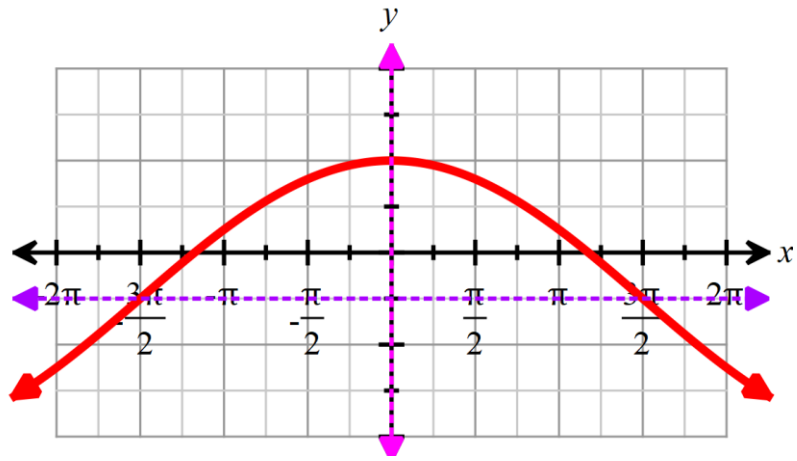
A = 3

P = 6π

D: $(-\infty, \infty)$

R: $[-4, 2]$

GAP: $\frac{3\pi}{2}$



5) $y = 2sin(\pi x)$

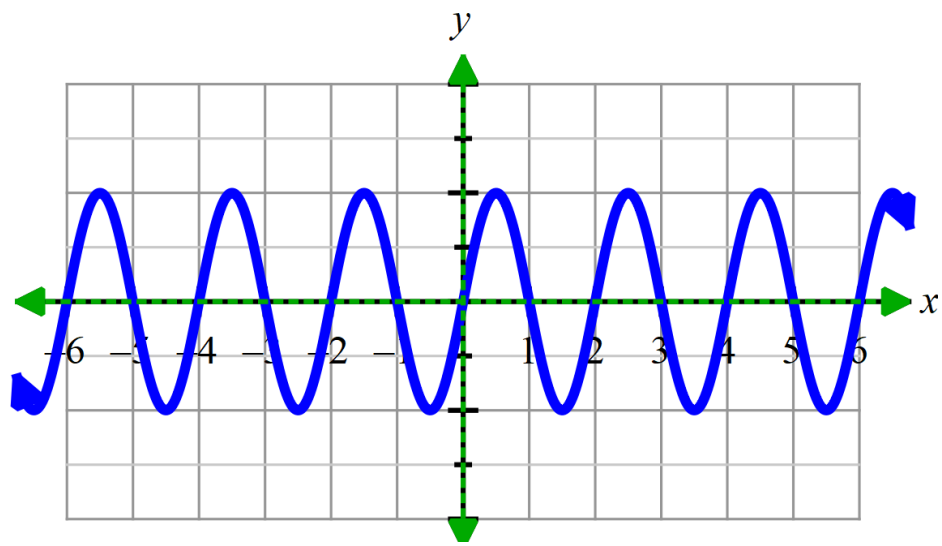
A = 2

P = 2

D: $(-\infty, \infty)$

R: $[-2, 2]$

GAP: $\frac{1}{2}$



<u>Find the period of each.</u>

6) $y = -4cos(0.2x)$

10π

7) $y = -16sin2\left(x - \frac{\pi}{9}\right)$

π

8) $y = 7cos(3x - \pi)$

$\frac{2\pi}{3}$

9) Write an equation of a sine function with amplitude 4, a range of [0,8] and a period of 4π.

$$y = \pm 4\sin\left(\frac{1}{2}x\right) + 4$$

10) Write an equation of a cosine function with amplitude 7, a range of $[-8, 6]$ and a period of $\frac{\pi}{6}$

$$y = \pm 7\cos(12x) - 1$$

Trig 4.5B Worksheet – Graphing $sin(x)$ and $cos(x)$
Compressions, Stretches, and Vertical Shifts

Graph each on the grid provided.

1) $y = -cos(2x) + 1$

A = 1

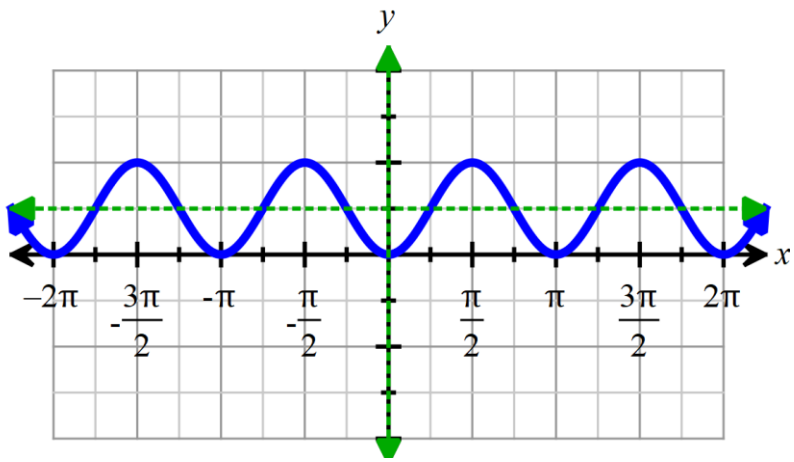
P = π

D: $(-\infty, \infty)$

R: $[0, 2]$

Midline: $y = 1$

GAP: $\frac{\pi}{4}$



2) $y = -sin(0.5\pi x) - 1$

A = 1

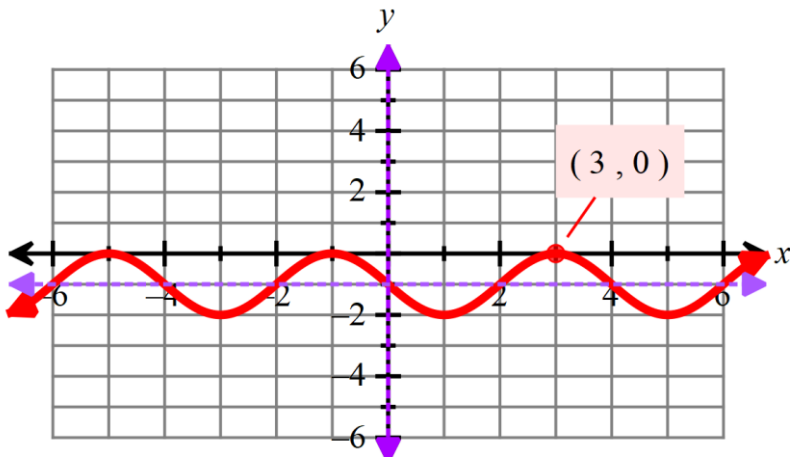
P = 4

D: $(-\infty, \infty)$

R: $[-2, 0]$

Midline: $y = -1$

GAP: 1



3) $y = 2sin3(x) - 2$

A = 2

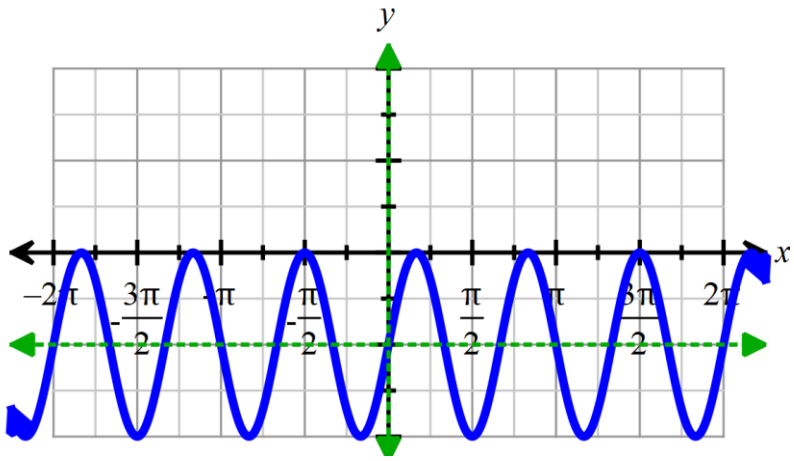
P = $\frac{2\pi}{3}$

D: $(-\infty, \infty)$

R: $[-4, 0]$

Midline: $y = -2$

GAP: $\frac{\pi}{6}$



4) $y = -2sin\left(\frac{\pi}{3}x\right)$

A = -2

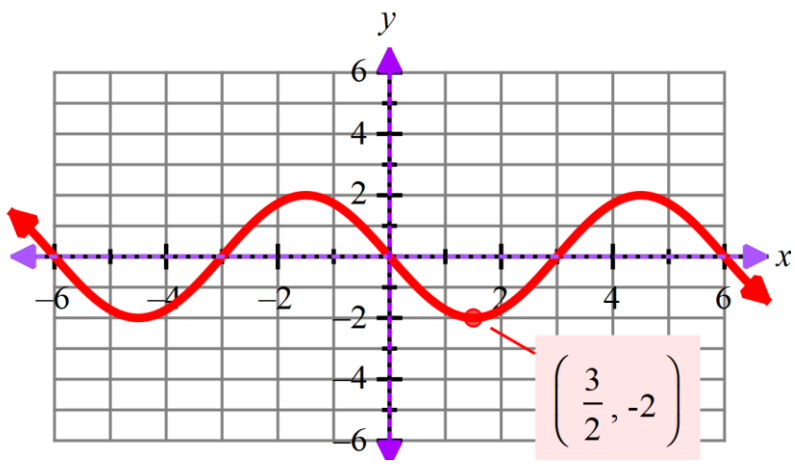
P = 6

D: $(-\infty, \infty)$

R: $[-2, 2]$

Midline: $y = 0$

GAP: $\frac{3}{2}$



Find the period and write an equation for the midline of each.

5) $y = -4cos(0.1x) + 2$

$P: 20\pi$

$M: y = 2$

6) $y = -14sin\left(4x - \frac{\pi}{9}\right) - 12$

$P: \frac{\pi}{2}$

$M: y = -12$

7) $y = 7cos(5x + \pi) + 10$

$P: \frac{2\pi}{5}$

$M: y = 10$

8) Write an equation of a sine function with amplitude 3, a range of [0,6] and a period of 8.

$$y = \pm 3\sin\left(\frac{\pi}{4}x\right) + 3$$

9) Write an equation of a cosine function with amplitude 12, a range of $[-14, 10]$ and a period of $\frac{\pi}{8}$

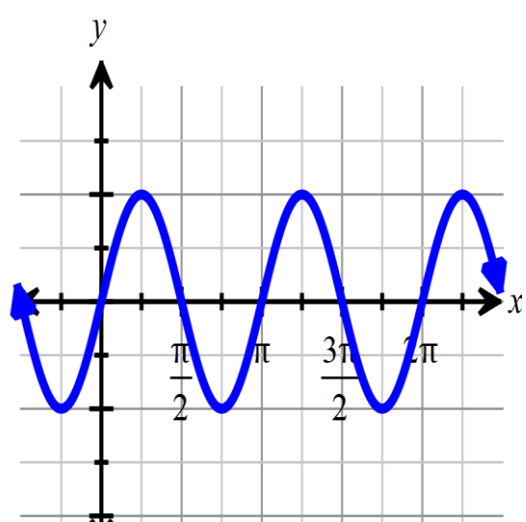
$$y = \pm 12\cos(16x) - 2$$

10) Write an equation for the following graph as a sine and cosine function. .

$$y = 2\sin(2x)$$

or

$$y = 2\cos 2\left(x - \frac{\pi}{4}\right)$$



Trig 4.5C Worksheet – Graphing $sin(x)$ and $cos(x)$
Compressions, Stretches, and Vertical Shifts

Graph each on the grid provided. The domain of all $sin(x)$ and $cos(x)$ graphs is all real numbers so I took that off.

1) $y = -cos(2x - \pi)$

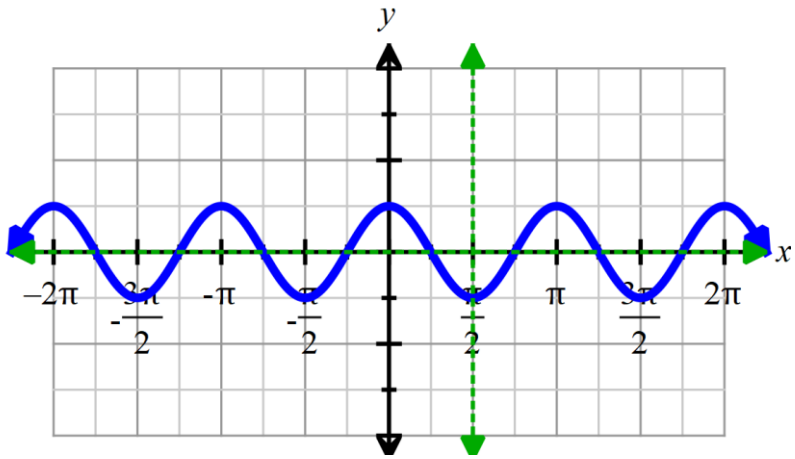
A = 1

P = π

Phase Shift: $\frac{\pi}{2}$

R: $[-1,1]$

GAP: $\frac{\pi}{4}$



2) $y = 2\sin(0.5\pi x + \pi)$

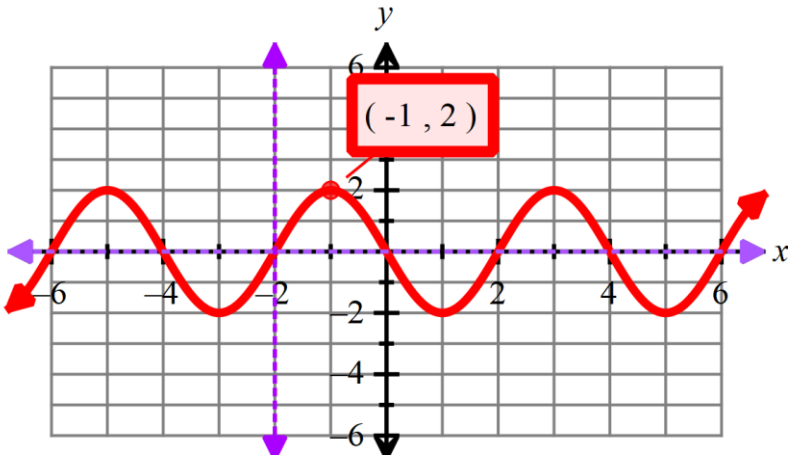
A = 2

P = 4

Phase Shift: -2

R: $[-2,2]$

GAP: 1



3) $y = -4sin3\left(x + \frac{\pi}{6}\right)$

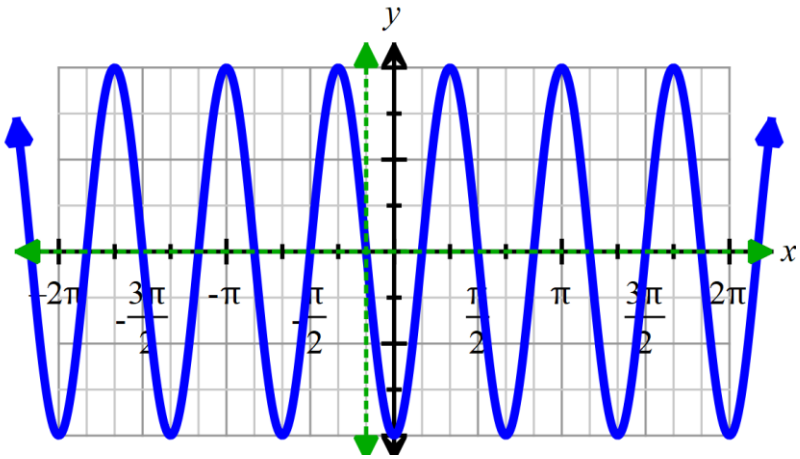
A = -4

P = $\frac{2\pi}{3}$

Phase Shift: $-\frac{\pi}{6}$

R: $[-4,4]$

GAP: $\frac{\pi}{6}$



**Use the scale of $\frac{\pi}{6}$ **

4) $y = 2cos(\pi x - 4\pi) + 1$

A = 2

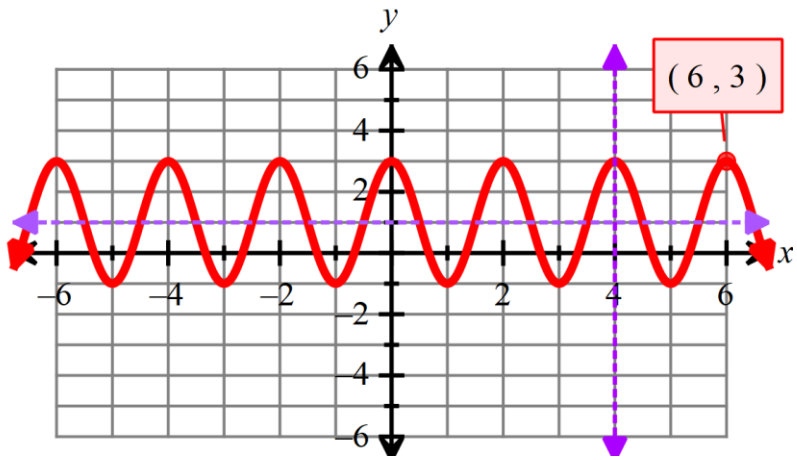
P = 2

Phase Shift: 4

R: $[-1, 3]$

GAP: $\frac{1}{2}$

Midline: $y = 1$



Find the period and phase shift.

5) $y = -4cos(.2x - 1) + 2$

$P: 10\pi$

$PS: 5$

6) $y = -14sin2\left(x - \frac{\pi}{9}\right)$

$P: \pi$

$PS: \frac{\pi}{9}$

7) $y = 7cos(0.5x + \pi)$

$P: 4\pi$

$PS: -2\pi$

8) Write an equation of a sine function with amplitude 7, a range of [10,24] and a period of 8π.

$$y = \pm 7\sin\left(\frac{x}{4}\right) + 17$$

9) Write an equation of a cosine function with amplitude 13, a range of $[-13, 13]$ and a period of $\frac{\pi}{13}$

$$y = \pm 13\cos(26x)$$

10) Find the value of k that will produce a phase shift of $\frac{2\pi}{7}$ given $y = 14cos(3x - k)$.

$$k = \frac{6\pi}{7}$$

11) What is the **maximum** value of the function $f(x) = 12cos(4x) + 19$?

$$Max = 31$$

12) What is the **minimum** value of the function $f(x) = -15sin(2x + \pi) - 20$?

$$Min = -35$$

Trig 4.6 Worksheet – Graphing $csc(x)$ and $sec(x)$

Graph each on the grid provided.

1) $y = -sec(2x) + 1$

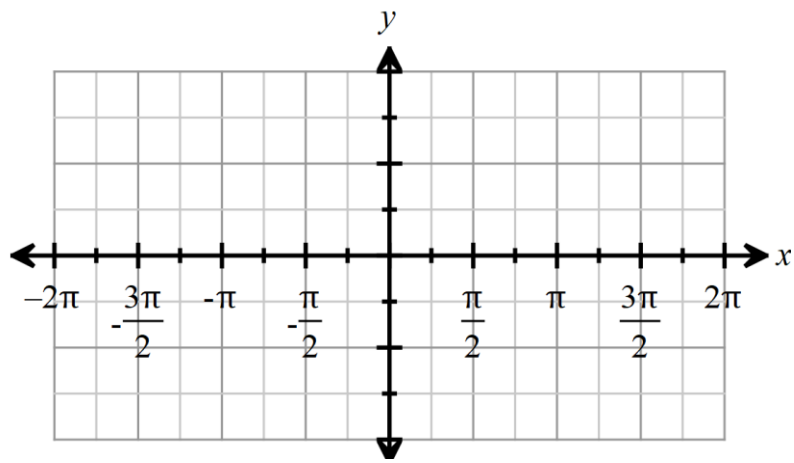
P = _____

D = _____

R: _____

VS: _____

GAP: _____



2) $y = -csc(0.5\pi x)$

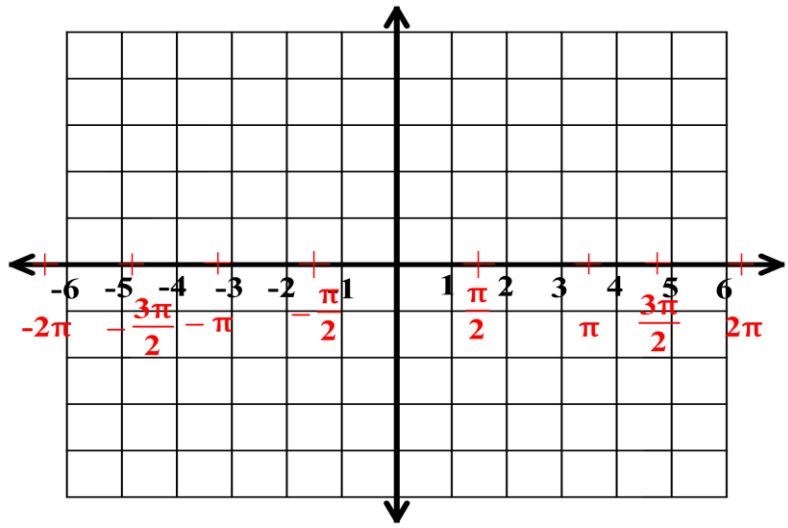
P = _____

D = _____

R: _____

VS: _____

GAP: _____



3) $y = 2csc3\left(x + \frac{\pi}{6}\right)$

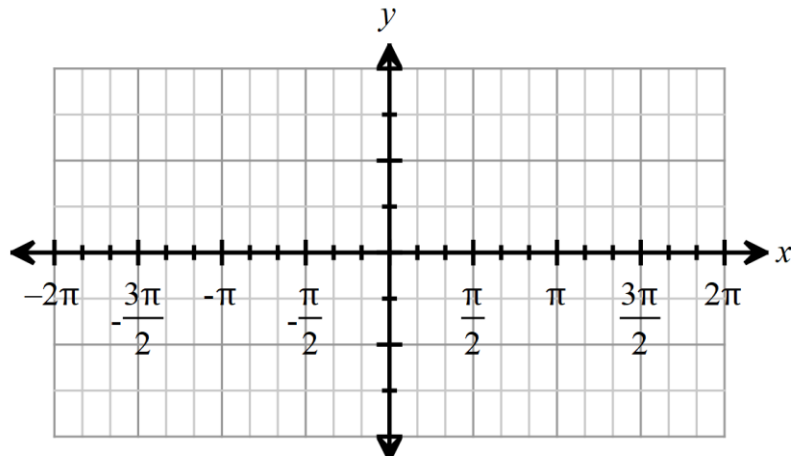
P = _____

D = _____

R: _____

VS: _____

GAP: _____



**Use the scale of $\frac{\pi}{6}$ **

4) $y = -2sec\left(\frac{\pi}{3}x\right) + 1$

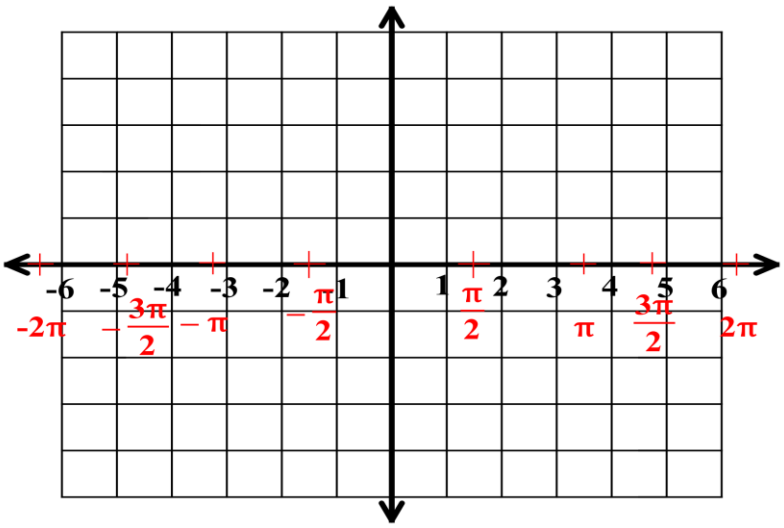
P = _____

D = _____

R: _____

VS: _____

GAP: _____



<u>Find the range and phase shift for each.</u>

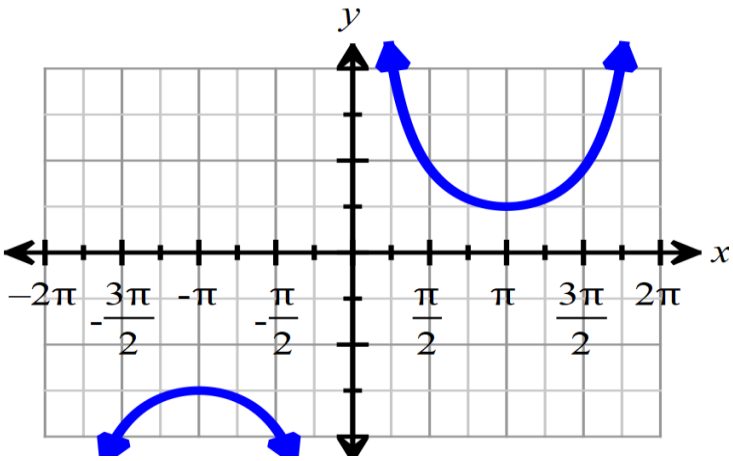
5) $y = -4sec(.1x - \pi) + 2$

6) $y = -14csc4\left(x - \frac{\pi}{9}\right) - 14$

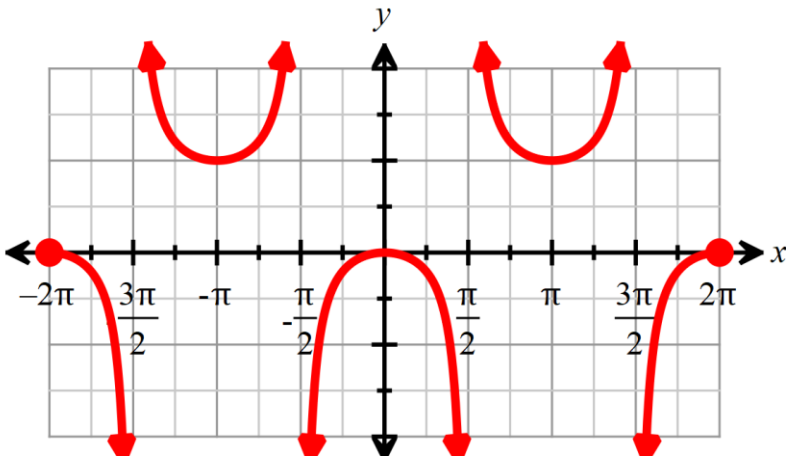
7) $y = 7sec(5x + \pi) + 10$

<u>Write equations for the following graphs.</u>

8)



9)



Trig 4.6A Worksheet – Graphing $tan(x)$ and $cot(x)$

Graph the following functions. Please use a different color for each function.

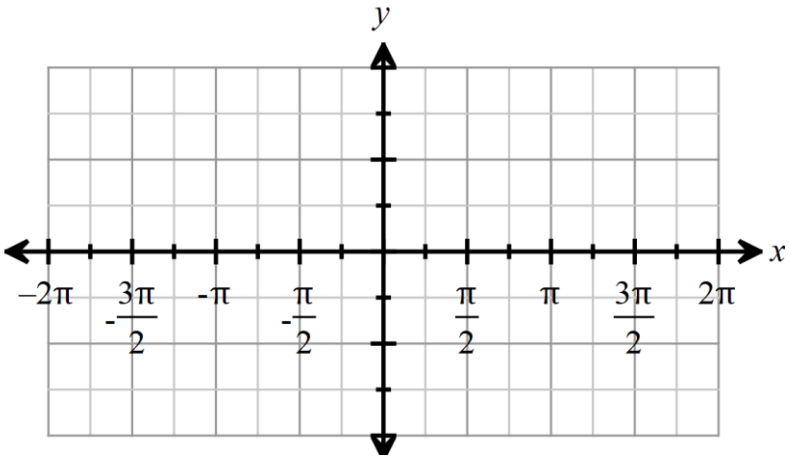
1) $y = 2tan(x)$ and $y = -2tan(x)$

P = _____

D = _____

R: _____

GAP: _____



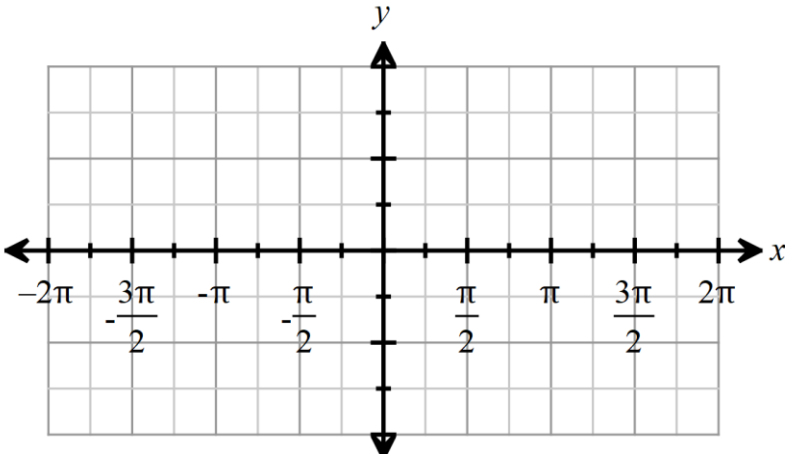
2) $y = 3cot(x)$ and $y = -3cot(x)$

P = _____

D = _____

R: _____

GAP: _____



3) $y = -tan(x + \pi)$

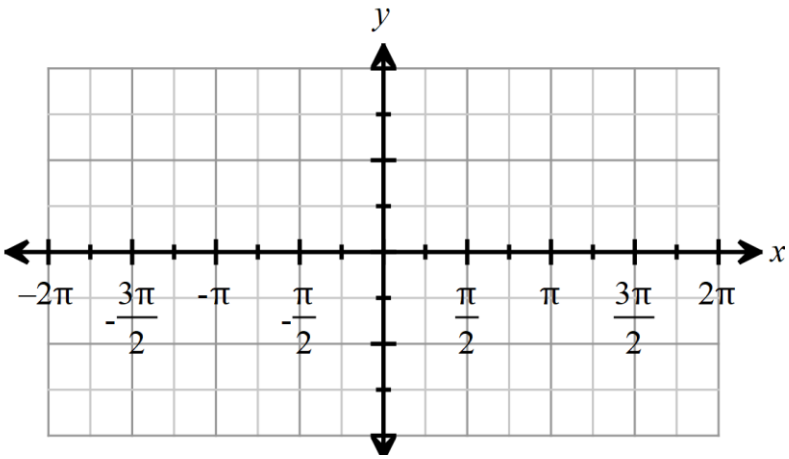
P = _____

D = _____

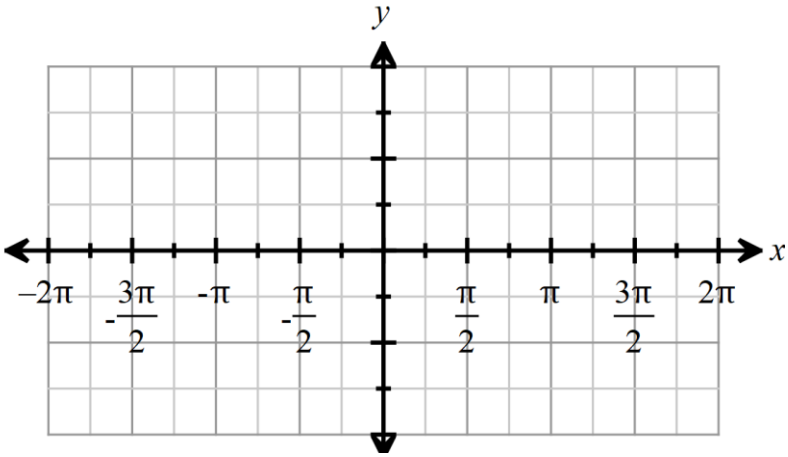
R: _____

VS: _____

GAP: _____



4) $y = -cot\left(x - \frac{\pi}{4}\right)$



P = _____

D = _____

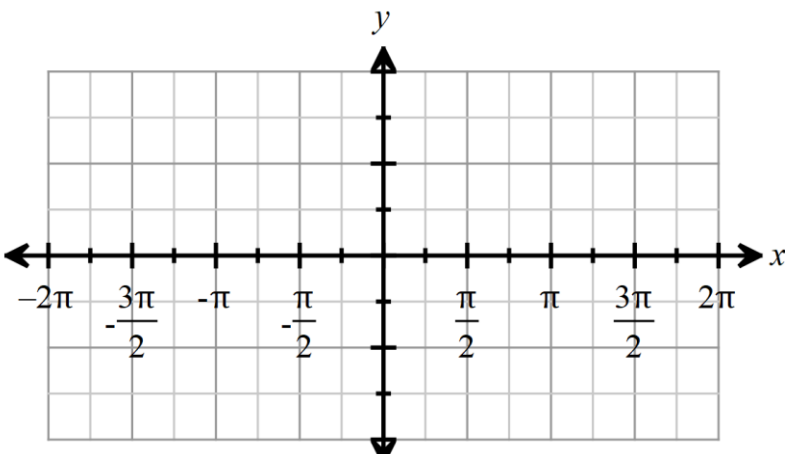
R: _____

Phase Shift: _____

GAP: _____

What is another equation for this graph?

5) $y = cot\left(x + \frac{\pi}{4}\right)$



P = _____

D = _____

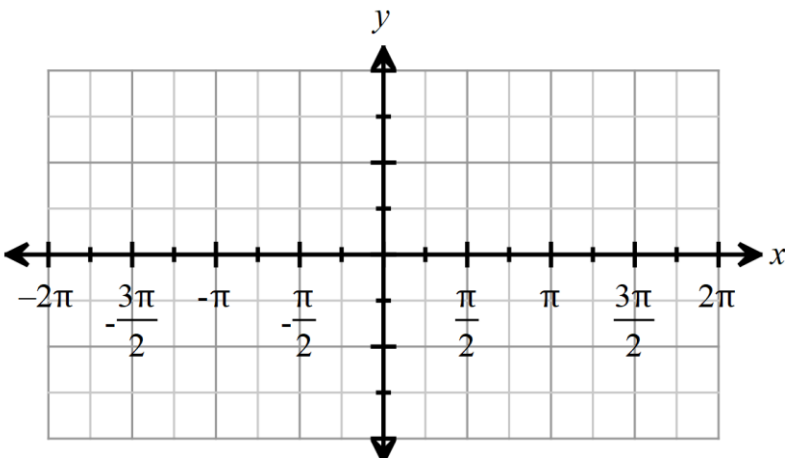
R: _____

Phase Shift: _____

GAP: _____

What is another equation for this graph?

6) $y = 2tan\left(x - \frac{\pi}{2}\right) + 1$



P = _____

D = _____

R: _____

Phase Shift: _____

GAP: _____

VS: _____

What is another equation for this graph?

<u>Find phase shift of each and state whether the graph is increasing or decreasing.</u>

7) $y = -8tan(2x - \pi)$

8) $y = 7cot3\left(x - \frac{\pi}{3}\right)$

9) $y = -cot\left(4x - \frac{\pi}{16}\right)$

10) $y = 3tan9(x - \pi)$

11) $y = -tan\left(3x - \frac{\pi}{4}\right)$

12) $y = 4cot(4x + 5)$

13) Write an equation for an increasing tangent graph with a period of π and a phase shift $\frac{\pi}{7}$

14) Write an equation for a decreasing cotangent graph with a period of π and a phase shift of $\frac{-2\pi}{9}$

Trig 4.6B Worksheet – Graphing $tan(x)$ and $cot(x)$
Stretching and Compressing

Graph the following functions.

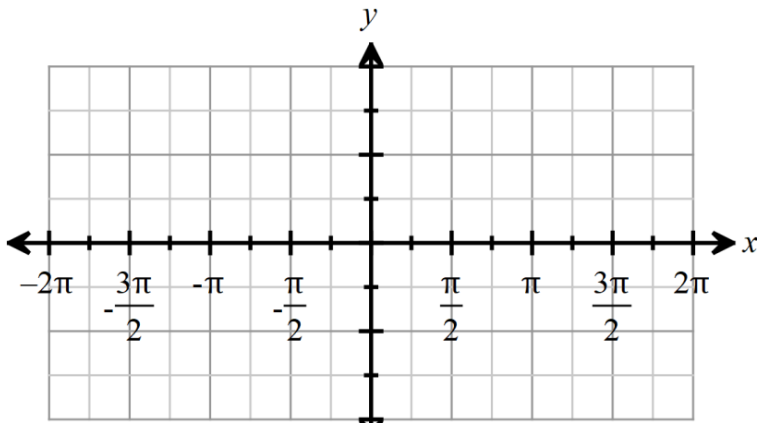
1) $y = 2tan(2x)$

P = _____

D = _____

R: _____

GAP: _____



2) $y = cot(3x) + 1$

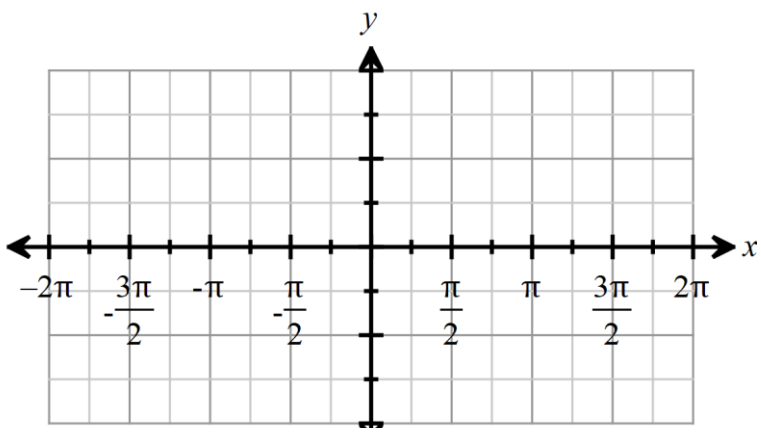
P = _____

D = _____

R: _____

GAP: _____

V.S.: _____



3) $y = -tan2(x + \pi)$

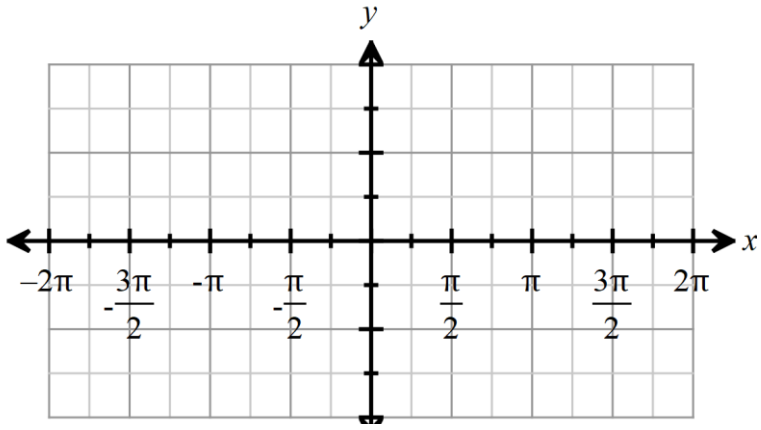
P = _____

D = _____

R: _____

Phase Shift: _____

GAP: _____



4) $y = -cot4\left(x - \frac{\pi}{4}\right)$

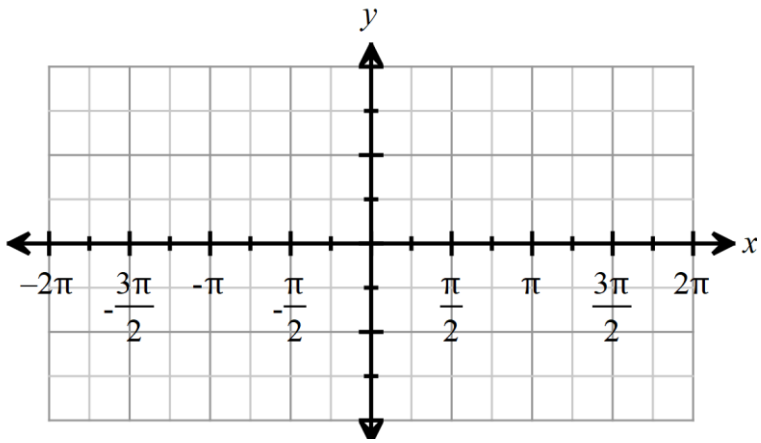
P = _____

D = _____

R: _____

Phase Shift: _____

GAP: _____



What is another equation for this graph?

5) $y = -cot2\left(x + \frac{\pi}{4}\right)$

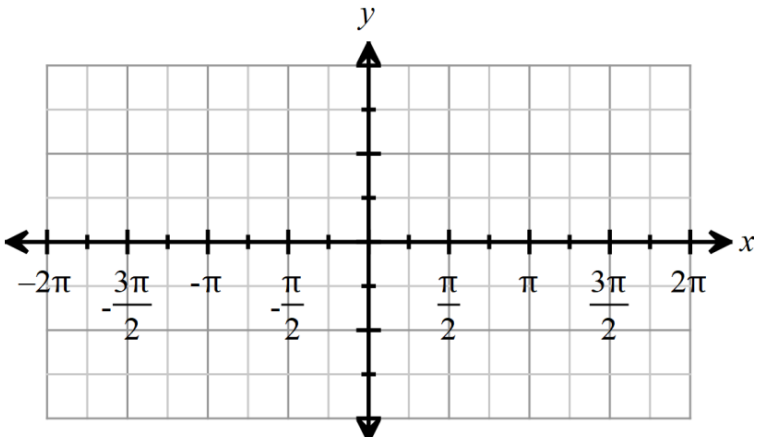
P = _____

D = _____

R: _____

Phase Shift: _____

GAP: _____



What is another equation for this graph?

6) $y = tan\left(\frac{x}{2} - \frac{5}{8}\right) + 5$

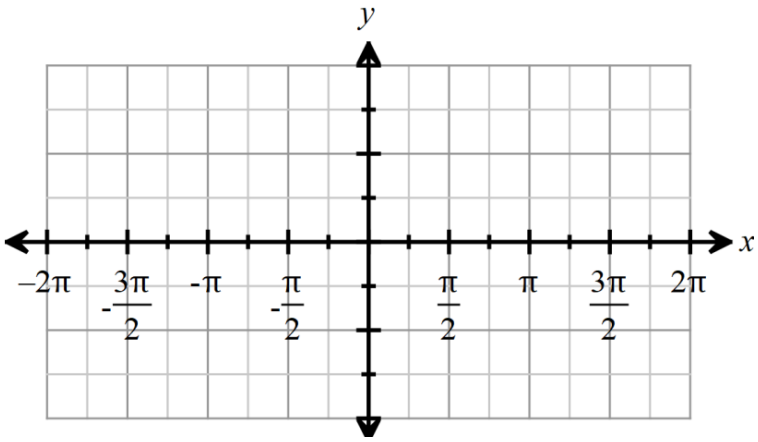
P = _____

D = _____

R: _____

GAP: _____

V.S.: _____



What is another equation for this graph?

<u>Find the period of each.</u>

7) $y = -8tan(2x - \pi)$ **8)** $y = 7cot3\left(x - \frac{\pi}{3}\right)$ **9)** $y = -cot4\left(4x - \frac{\pi}{16}\right)$

10) $y = 3tan9(x - \pi)$ **11)** $y = -tan\left(3x - \frac{\pi}{4}\right)$ **12)** $y = 4cot(4x + 5)$

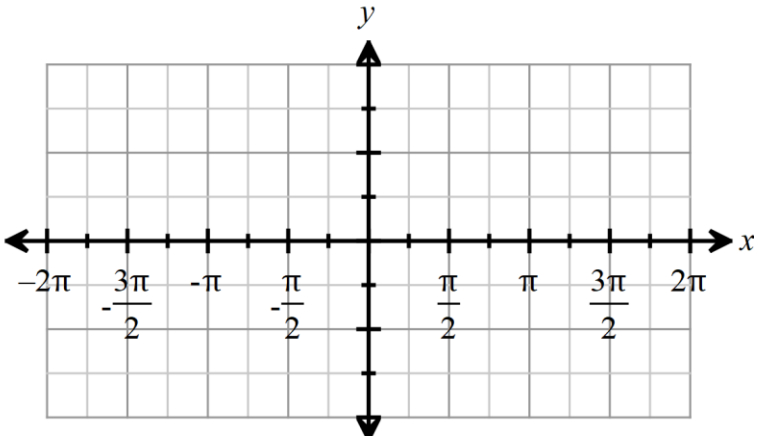
13) Write an equation for an increasing tangent graph with a period of 4π and a phase shift $\frac{\pi}{7}$

14) Write an equation for a decreasing cotangent graph with a period of 3π and a phase shift of $\frac{-2\pi}{9}$

Trig 4.6C Worksheet – Graphing All Trig Functions

Graph each and list the important information.

1) $y = -2tan(2x) - 1$



P = _____

D = _____

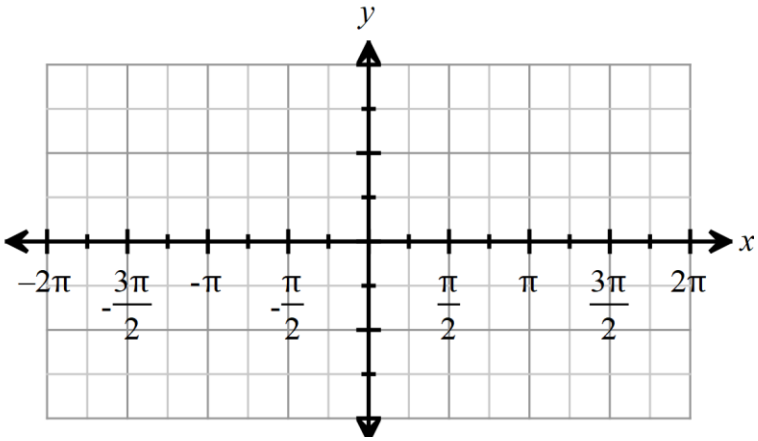
R: _____

GAP: _____

V.S.: _____

Write a $cot(x)$ equation for this graph _____

2) $y = 3cot\left(\frac{x}{4}\right)$



P = _____

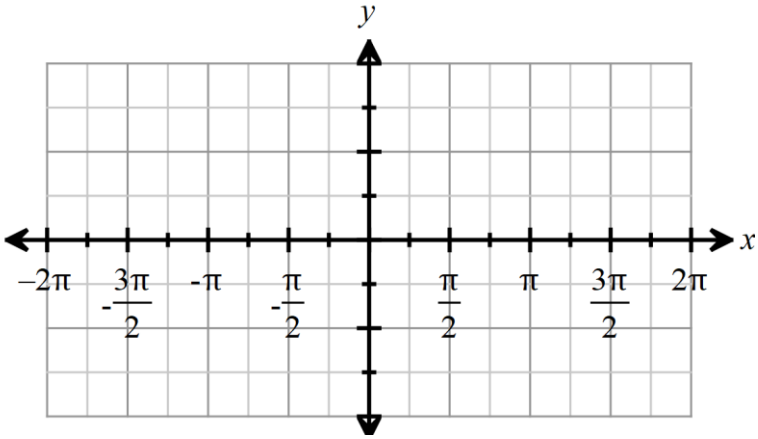
D = _____

R: _____

GAP: _____

Write a $tan(x)$ equation for this graph _____

3) $Graph\ y = -sin\left(\frac{1}{2}x - \frac{\pi}{4}\right) + 1$



A = _____

P = _____

D = _____

R = _____

VS: _____

PS: _____

4) $y = 2cos(2x - \pi)$

A = _____

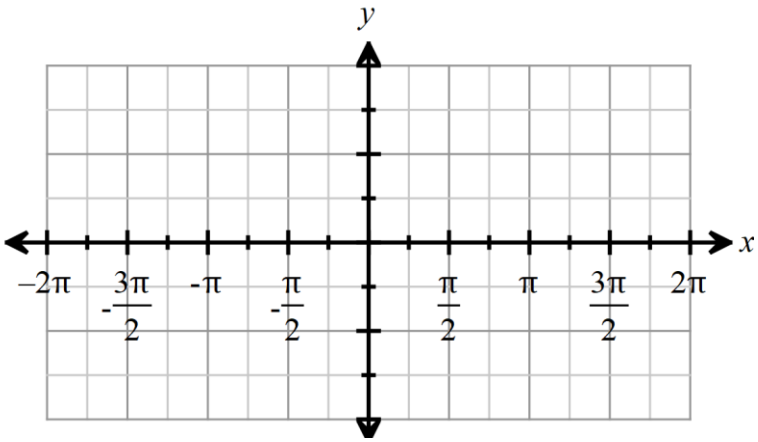
P = _____

D = _____

R = _____

PS: _____

GAP: _____



5) $y = -3csc2\left(x - \frac{\pi}{4}\right)$

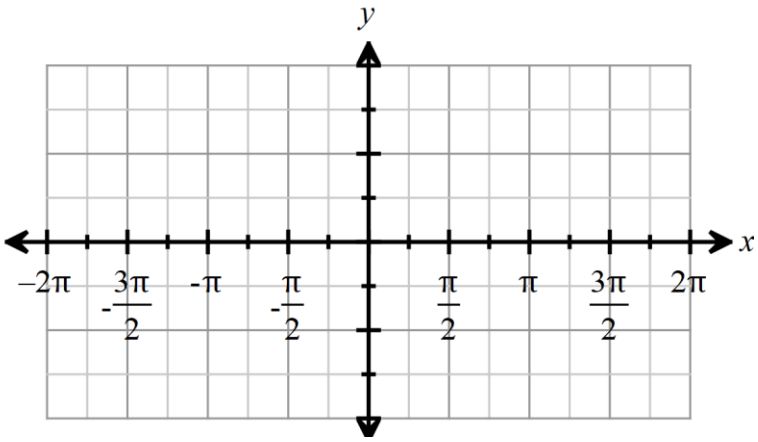
P = _____

D = _____

R: _____

Phase Shift: _____

GAP: _____



What is another equation for this graph?

6) $y = -sec(4x - \pi) - 1$

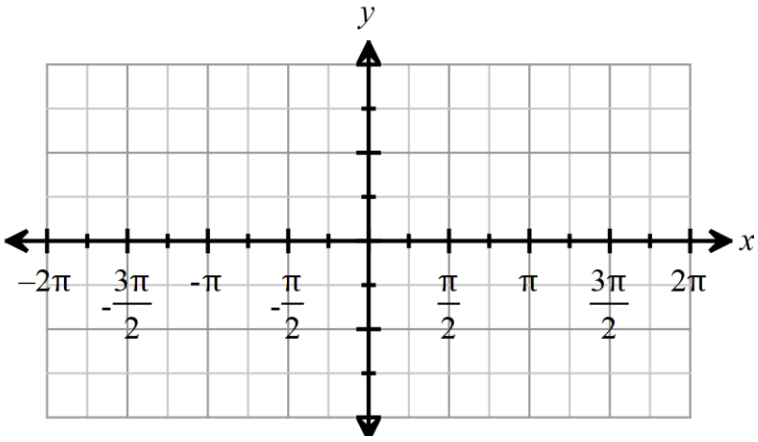
P = _____

D = _____

R: _____

Phase Shift: _____

GAP: _____



What is another equation for this graph?

7) The period of a decreasing $tan(x)$ graph is 3π with a phase shift of $-\frac{\pi}{6}$. The graph passes through $\left(\frac{7\pi}{12}, -3\right)$. Write an equation to represent this situation.

Trig 7B Worksheet – Trig Inverses Worksheet

Find each without a calculator.

1) $sin^{-1}(1) + cos^{-1}(0) - tan^{-1}(1)$

2) $cos^{-1}(-1) - 2sin^{-1}\left(-\frac{1}{2}\right) + 3sin^{-1}\left(\frac{1}{2}\right)$

3) $sec^{-1}(-1) + 15sin^{-1}(0)$

4) $csc^{-1}(2) + 16sin^{-1}(-1) - 2cos^{-1}(-1)$

5) $sin^{-1}\left[cos\left(\frac{\pi}{6}\right)\right]$

6) $cos^{-1}\left[tan\left(\frac{\pi}{4}\right)\right]$

7) $sin\left[cos^{-1}\left(\frac{3}{5}\right)\right]$

8) $tan^{-1}\left[sin\left(\frac{-\pi}{2}\right)\right] + \cos(0) - 17\sin(0)$

9) $cot\left[cos^{-1}\left(\frac{12}{13}\right)\right]$

10) $sin[sin^{-1}(-1)] + cos[cos^{-1}(-1)] + tan[tan^{-1}(-1)]$

Use a right triangle to write each expression as an algebraic expression. Assume that x is positive and that the given inverse trig function is defined for the expression in x.

11) $tan[cos^{-1}(x)]$

12) $cos[sin^{-1}(2x)]$

13) $cos\left[sin^{-1}\left(\frac{1}{x}\right)\right]$

14) $sec\left[cos^{-1}\left(\frac{1}{x}\right)\right]$

Determine the domain and range of each function.

15) $f(x) = sin[sin^{-1}(x)]$

16) $f(x) = sin^{-1}[sin(x)]$

17) $f(x) = cos[cos^{-1}(x)]$

18) $f(x) = cos^{-1}[sin(x)]$